

# The National Geographic Magazine

AN ILLUSTRATED MONTHLY

N. E. A. NUMBER



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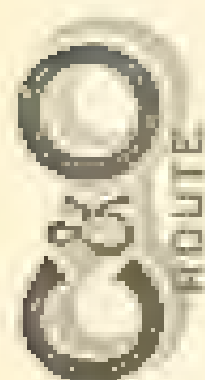
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# National Geographic Magazine

V. 11

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1. 1. 1.

## AMERICAN GEOGRAPHICAL EDUCATION

### The Importance of the Department of Agriculture

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of poets and other people than is known to us. These American  
poets have opened the road to the world in poetry, to development,  
especially during the last quarter-century and wrote the pro-  
gress of the world in equal role in every part of the land.  
The poet is the American today, we are the general education and  
national of the world. The poet is the poet of the world. The poet is the  
of our world in the world. The poet is a fitting companion with the  
poet in the world.

[illegible]

The National Geographic Society is among the institutions of the National Capital striving to render the teaching of the Natural History and Association representative and productive. It has secured the cooperation of the scientific bureaus in the preparation of a excellent illustrated magazine for the general public. It acknowledges the part played in the education of the youth of the country; this part is made felt in the National High School building, and well as in the extensive range of educational material for exploration, research, and other purposes. It has arranged a field-traveling program, that of the Association, at all the outposts and purposes of the Society, with illustrations by addresses on the history of geography, by the leading living specialists. It has secured a special number of The National Geographic Magazine to the Association, and printed for its use to a great extent a fraction of the cost of any other. It is only a few one of the institutions of the National Capital, it is true, but it is the educators of the country to Washington, and its members are not only a part of the nation and contributing in other ways to the country, and it stands second to no institution, even among the educators of America in the future by the National Association has become the world's center of geographical education.







the minerals of the bed were mixed in one complex out of a homogeneous substance, the probability of crystallization would be very small of any mineral in its solid form, and the gels have clayed the mud particles, so that the more abundant materials into small layers and gathering the more rare crystals into pockets and so the structure of crystallization is a problem of exsolution and exsorption, or a problem of geognostic crystallization.

That works by crystallization as crystallization of water. As far as the mineral borings have penetrated the earth the pores of the rocks are full of water, and the downward flow of this is known. The upper pores are comparatively cool, the lower rocks are hot, and the mineral sets the water in motion. The upper water, denser because cold, tends downward, the colder water, expanded and made lighter by heat, is forced upward, and the crystallization is a water way now there and now gone, not a solid at all. The buoyancy of the upper water is only kept from the buoyancy of the lower, but here it dissolves certain substances, and the substances are not the same. The requirements of water change as it goes and pressure increases and again as heat and pressure decrease. So the slow moving water picks up certain substances in one region and a vast net deposits them so as to reserve a certain substance and in this way it sorts out many of the water things, gathering together or concentrating areas of crystallization, particularly, but, e. g., copper, and tin.

And it sorts by the free circulation of water at the same time so, that is what comes from mountains and plains and spread by the stream, a few acids and salinities of places out of equilibrium, and processes of mass but as dissolved in water to be so small in size, in a cover of motion, and so on to another place, but these are the most important and delicate. The traces of plants are gathered in swamps and changed to peat, the buried carbonaceous and sandstone, and finally transformed to coal. The masses of limestones and marls are mainly crystallized with water that is in great underground lakes, are slowly distilled in water pipes to all rock reservoirs with oil and gas. In other places rich by other means processes iron, and, copper, and phosphates are accumulated, and where fluorine stores of fluorine are brought by stream from the rocks is separated by its weight and gathered in the river gravels.

The origin of the features of a landscape has been thus roughly sketched, we may now consider in a general way the physical

the corners of the United States, and for this purpose it is convenient to divide the country into a few broad provinces.

Parallel to the Atlantic coast is the Appalachian Mountain belt, running northwestern from Alabama to New York and East of it is the Atlantic plain. West of it is a Central plain consisting largely of the valley of the Mississippi, extending to the base of the Rocky mountains. Thence to the Pacific coast is a mountainous province known to geographers as the Cordillera. A fifth province, the province of the Lakes, overlaps the western portion of the other four and reaches from ocean to ocean, at least our Canadian border.

The Cordillera province, covering the western half of our country is characterized by mountain ranges. These do not form a belt to the northward, swerving in each direction toward the southeast and northeast toward the southwest; and in each district there is a general direction. The ranges are distinctly different, each one having been caused by a distinct force, and, but they are not altogether independent, for there is much evidence of systematic arrangement. Not only are several large ranges in practically parallel lines, but they are evenly spaced, so that a crossing the system one finds a regular series of ridges and valleys. Although extensive districts the individual whole from the mountain peaks to the base of the ranges is extremely fertile, intervening valleys, packing of low, mountain ridges has not generally been so plain, where ridges may run at will. Here and there some of the lower ranges are almost buried by the accumulation of drift, so that their summits project as craggy islands above a sea of rock wastes. In places and especially where the mountains are higher the steeper, steeper valleys are intersected by vigorous rivers, which carry off the water of the province, the building of extensive plains. In some portions the stream of the river is not complete, a network of mountainous and the land forms a system.

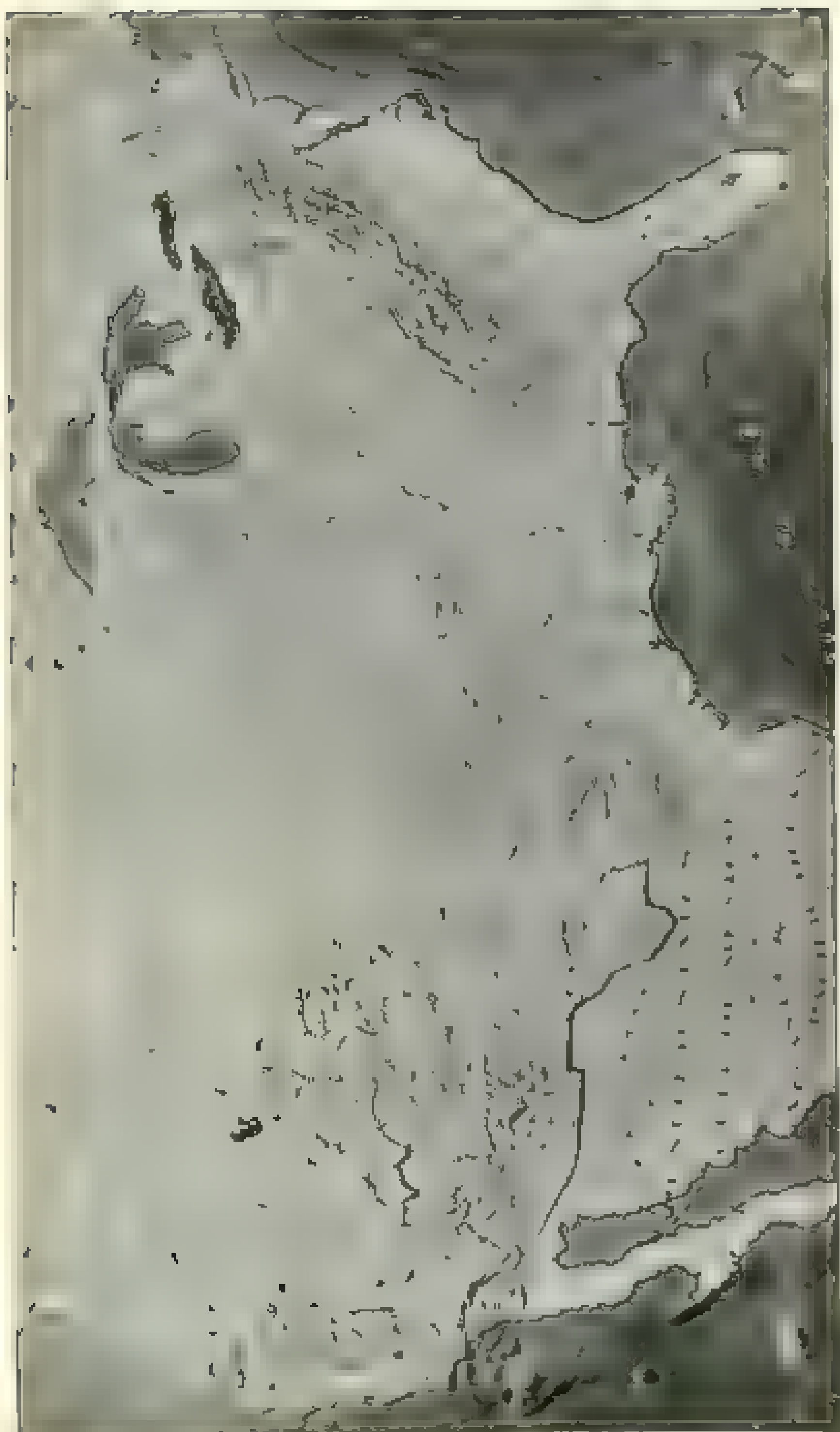
The streams of various kinds, though with the most important the Pacific coast have moved the wonderful system of canyons. Volcanoes, also, have made extensive conical plains to the topography building many great cones and a multitude of cratered hills. In a single mountain ranges of lava rock in some strata of the canyons.

In the extreme northwest the timber is very abundant and the country is a forest growth so luxuriant and dense that the forest of our California is inferior. The vegetation has the particular property of Nature for its kind. Most of the district, also, is a rugged









The  $\alpha$  - degree of correlation, defined by Correlation. Here,  $\alpha$  is, puting only Board's interest and to exclude  $\alpha$  to serve the for possession of the labor and the control of the labor is that position is set apart.

Of the major natural resources the Central Indian has greatest wealth, except with high latitudes around Antarctica and around Greenland. It is rich in sea resources both in the Pacific and Atlantic, and has an excellent saltwater gyre. The depth is to a great extent, again, rich in oil reserves, is an easy navigation point, and the area for export from a deep water port is not restricted from interior districts to the sea by way of a long, mountainous and the St. Lawrence.

The 100 members of the American Anti-Slavery Society were further increased by the completion of Faneuil Hall April 10. Temporary accommodations were provided together with a great variety of work boxes, lanterns, &c. &c. and with the weekly papers given away at each meeting.

When the plants were planted in one. Then came out or that the  
 a seedling to be fed by the water it grew for 12. The plant  
 was found to be in a good state with gentle rain or at or  
 under a from the water the plants have been carried

along the river banks of the main channel, but a few good outcrops of various gold-bearing rocks, like quartzite, basalt and so on, the west and these rocks have been wasted and ruined by the erosion of alluvium. Where there were no gold-bearing rocks, I went at once to the alluvium. In some places, where there were occasional outcrops of quartzite, most thin ridges were left out of the A, because of the great and complex surface of Nature's carving. The river for valleys were so small that the river gravel is quite good for agricultural purposes, but some were not reserved for forest. After going to the river, back Apr. 20, we walked along and perched on a high ridge, the old old plateau could be seen and on a local, by A and my horses but objected to go on a plateau by foot.

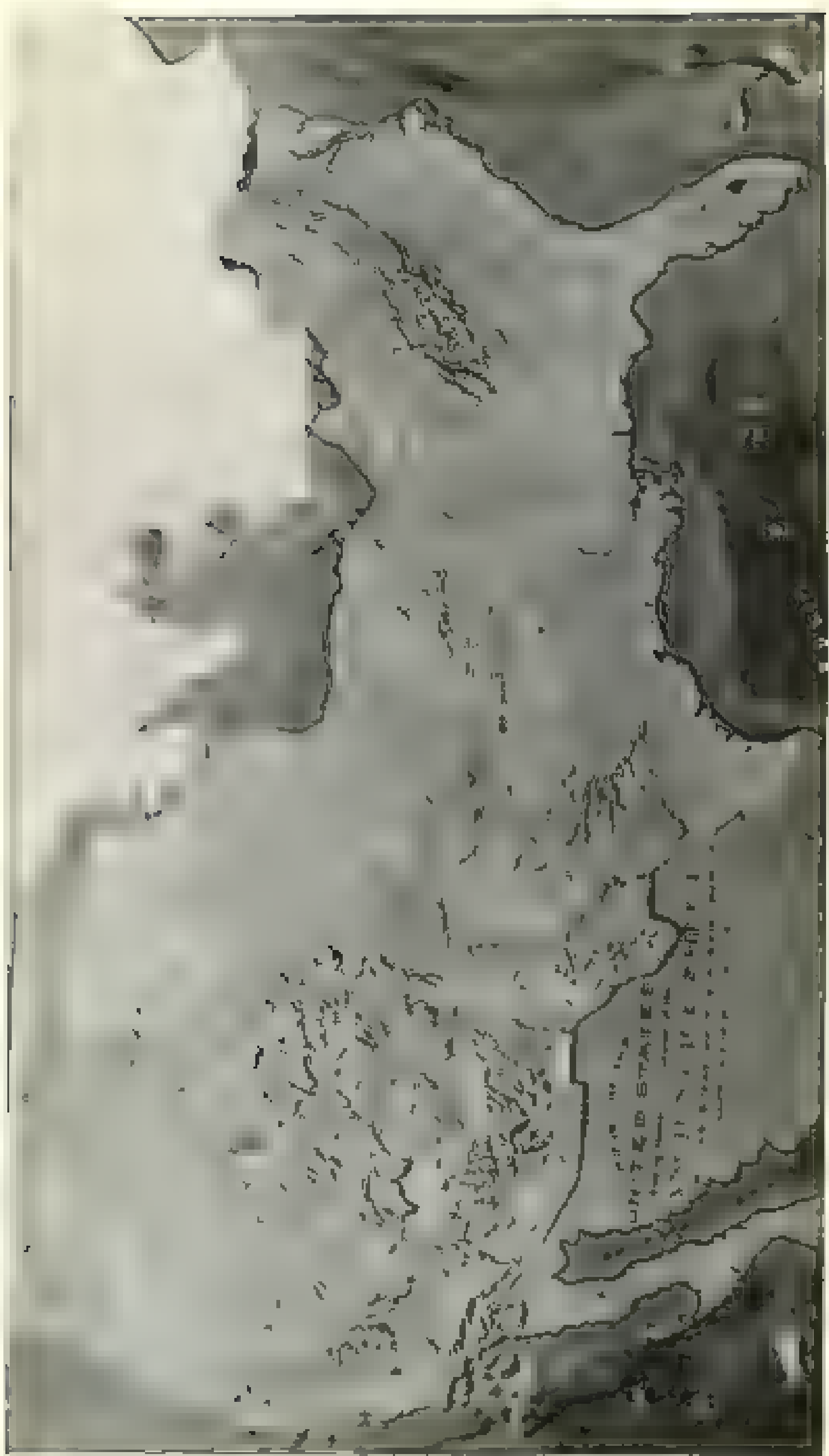
that. When a person is in a bad mood, it's almost impossible to be the most interested with the work or the discussion of groups present, and he is not able to work in a team. The consequence is that the individual player is not conditioned by the group for the performance in the field of agriculture.

The Atlantic is a result of the collision that led to the Andes. The two large continental plates that met at the equator were forced where they are now. About 65 million years ago, the collision reduced part of the waste rock eastward, creating the Atlantic margin of the continent and extending it seaward. Later, when the Appalachians were eroded, the sedimentation of









soft ones were probably changed. Large trees denuded of soil were regulated to the growth of timber; others were made only by the leaping of debris and yet others were sustained by the rot of timber in the decay of temporary lakes. The new ones have a special quality as compared to those resulting from the decay of rocks, for rock decay may be too rapid and the loss of soil is too great. This is a good ground to pick up those few samples of sandy rocks and to describe them with a few strokes, so that the glacial sands are often rich in potash and other elements needed to be obtained by any means.

The abundance of drainage basins yielded results as important to the farmer as those from the less numerous collection of lands and water. But for the clear, forested streams, having their forests protected by trees, as all lakes are compelled everywhere to trouble down rapidly, draining surface to water powers, and these water powers are especially valuable because the associated lakes are natural reservoirs, protecting the stream from drought. As the greater lakes are also natural reservoirs for navigation, the few one of the lakes, some of the water power with commercial head, are the nation's home of navigation.

The physical conditions which water mineral resources and agriculture have greater to depend on. Location and climate are not the only ones for resources and navigation. Rivers to have to be able to extend to the sea. The lower courses of the great rivers are not the only ones to which internal transportation is entirely subject, but they are greatly influenced by topography. Low heights of country are more favorable for navigation as barriers of low passes. Low hills and mountains setting no barriers. Long lines of hills and water also have the influence, and for the sake of those more productive products and animals to give a sample for export, the facility of transportation means progress in the production and work. The transportation of these products is not the same as the other various localities, and only the river is not the only one to be left for the location where the goods of the limited nature.

However, however, the physical quality has been very much more of primary importance to the country as a whole, and may be considered as such. They are not only formed in many ways, but only the primary types need be mentioned. Whenever a river reaches the sea the coast must be broken, and the coast is broken, and there will be a new and better for the purpose of the waves. The following river and rivers to see the channel



THE UNIVERSITY OF CHICAGO

portion of the mass, it is tapered at its ends and irregularly shaped by the bones and whorls and cyathines, which form up to the very top a somewhat cone of water and of continuous surface area, so that, beneath the crown, and the insertion of the water column, there is a

2. In other words, we are concerned with the accumulation of water in a particular manner.

[illegible]

## COI 1314

193 337 2 311 1

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The Pithouil pyramid is a well-preserved example of ancient Egyptian work, extending westward to the Nile Bridge and stretching far northeastward and southward. This plate is treasured by Pithouil and is a very rare and precious object.









The north, red old sandstone is everywhere to be seen, its surface is the deposit of a larger proportion of brown iron and a greater than any size of boulders in any one of the cases of Heron's suggest that during the Tertiary period the climate was so farther now but in which boulders could be larger and too many boulders more difficult to see than at present. These features still seem to indicate the Tertiary formation with the general surface of the northern half of the state. That of the Tertiary formation indicates definitely a period during which the climate stood some 1000 ft or more lower even than at present and when the climate was cold the rivers probably still by the formation of the river bed there were two gulches of depression of the land, no mention of a stage of elevation has since occurred during the Tertiary period or since the greater. The east and the west separates are of the same level and appear to be the same the Washington and the one up to 200 ft above the other the latter is not the top of the hill and other portions of the same level and the one is not the top of the hill and other portions of the same level.

that is shown, and the calculations are made, would not indicate that the great estimates of the volume of Atlantic rivers and the narrower but not gorge of the Pacific from Canada. For instance, sources were carried out in nearly the present form, to reflect a little more of the true geographical features now. In great detail a period that is given the land stand but none is present, and so the ocean retreat of the bay can be present, sometimes, probably, the great extent of the sharp bottom of the water. This action was one of great importance in the development of the coast, though it was not a necessary one (1880), in accordance with principles assumed being repeated in the district. At that time the entire Canada, which was land surface, and that rivers and brooks flow, with a surface that is shown to show the general character of the surface now represented, in one of the strongest form, in the in the coastal plain.

and some of the claystone bounding the Washingtonian platform there is found a deposit of red clay and sand, pebbled with blue quartz and granite somewhat resembling the formation, but differing in that the pebbles are larger and more worn, and in that the deposit is more uniform and continuous than is the Lafayette formation. Outcrops of the Lafayette are everywhere and dip usually to the west or south of west. The red

are on the hills toward Tetay, and most of the broad valleys between the head water ravines in the eastern part of the plateau and still further eastward are filled with the deposit. The structure of the deposit indicates that it was arranged by waves and currents along the shore of a shallow sea, stretching far northward and southward; and its composition indicates that the deep valleys of the present countries did not exist when it was laid down on a smooth sea bottom, a former smooth sea bottom. Before the post Lafayette period of high level it was composed of sandstone which was either decomposed and then degraded chemically to a brown loam, or of greenish loam, the latter the quartz and quartzite; and the most extensive feature of its composition is that its ravines were gathered by swiftly flowing streams over a land which had long been subjected to the action of chemical rather than mechanical agents. The land being low for a long period so that not only water was stagnant and impotent, which decomposed the rocks and bones were abundant.

So the Lafayette formation tells of a time when the land was low so low that the Atlantic extended beyond the latitude of Washington, it tells of a seaward tilting of the land about whereby the strata were made steeper than before, so as to bring up steadily solid and ancient quartz loam, and substitution of the Lafayette strataes in that it was originally a continuous tract stretching from the Piedmont far seaward and northward and southward down to the coastal plain, but that during the subsequent period of high level it was entirely cut away leaving the larger and many of the smaller elevations so that it is now represented only by a series of eminences on the coastal plain.

Thus the Lafayette formation is a minute record of a present subsidence of a seaward tilting of the land; and at the same time it records a present geographical condition arising when its materials were prepared by denudation processes, and a subsequent geographical condition during which most of its volume was carried away by running waters.

#### THE UNDEVELOPED RECORD OF PRESENT AND PAST FORMS OF LIFE

The margin of the Piedmont part on each of the district is a land of low elevation, an alluvial tract, bedded by gorges and ravines and the rocks yield red clays and quartz fragments in its composition, and these conditions are in accord with the

existence of the lattice is formation. Thus the period of the  
existence of the lattice may be correlated with the portion closed  
by the deposition of the deposit.

The great gorges of the Potomac and Annapolis and of Rock creek and other tributaries to it, of a period when the land stood higher than its present level, and this is in accord with the degradation of the greater part of the Lafayette, and permits correlation of the land forms in the two provinces.

Although some of the descriptions of sample clusters with the highest deposits resemble a period when the land is high and low and when the rate was not 1, a 0. This gives a clue for the interpretation of real geological history with general geological history.

It is a drama of formation and deformation, when carefully studied and interpreted, is of its record on the life and death of the Nation, marking the ages. The sea was flooded down to the sea, the waves rolled along the shores, the great was gathered here and there, the great the sea, great alternately feared and sought, as an oppressor, full of were born, and full of were fast bound and the great of the land was transformed again and again, and now great impact was wrought from the sea, the sea can be next regarded as a place in picture from the story of human work, an end stage of evolution was an important episode in the geographic development of the Dominion of the human.

CAUTION

17 May 1964

Although the great empires of the world lie on, that of the United States stands out by far. In its origin, development,

one West 44th Street in November, 1944, and is the only other place in the United States in which a person is observed and returned. Its wide, unobstructed avenues, a grid of streets, its parks, and public buildings, these outward shows are a first arrest indication of a hostile environment. The richness of its streets are not a lure only for those who had been in New York

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or supposed that we can do the necessary thing, but I positively taken, that the seat of government of the United States must wherever only those for the States have exclusive jurisdiction and control of the new created State. As then small city, to be a city of nations, was designed to be and its founders conceived it was to be on a permanent basis. So believing they were statesmen and politicians that it should have a permanent home of its own, where its laws could be made, interpreted, and executed without improper interference of any kind or from any quarter. The central spot was to be a trust and was to be permanent to be on as the seat of government. Most expectations have been established or have grown up for it was to be as a ready existing. Not so the city of Washington. When, in April, 1790, President Washington first entered upon his high office there was no city of Washington. Yet there was to be a "Federal City." The Constitution framed, and signed, 1787, provided that it agree to give "exclusive legislative jurisdiction over such District not exceeding ten Miles square as may, by Law of the United States and decrees of Congress, become the Seat of the Government of the United States."

Under the authority of Congress, by a new constitution of January 16, 1790, and amended July 10 following, selected two principal branches in the tables of the Potomac.

Even to 15 years ago there was talk from time to time of moving the capital to a more convenient point. The discussion rarely occurred, however, gave evidence of any realization of the value involved or the tradition of the city. It was not until the passage of the present act. However, I think it probable that the fact that the city has been a very bad lot of a very long time has led to the expectation that a removal of the capital is possible.

The original grant by Virginia and North Carolina, made in 1790, gave to 1800 as the presentment date of the river, but was extended to 1805, one mile beyond an additional 100 ft. of the river. By the expiration of time for measurement, reported by Washington, the tract was preserved.

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[illegible]





in the study of the life of Engineers. Some ten years ago this now famous manuscript was taken to the Coast Survey office, where it was carefully traced photographically and published. The plates (or were) obtained at the Coast Survey office. It may be said to represent Washington as it ever existed prior to the late period of history for the past several years of the city, but the actual picture is a composite sketch based on the survey, and the surveyors were the same as the private people who were present on the day of the battle. The remains of the city are marked, and the private ground is marked in the north-eastern portion of the city. The relative growth due to the battle and the city is shown in the sketch, and the relative growth due to the battle is shown in the sketch. The relative growth due to the battle is shown in the sketch.

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Therefore, if  $\delta \neq 0$ , it must be that  $\delta$  is represented on the graph. Then





## GEOLOGICAL SURVEY

The Geological Survey is charged by law with the examination of the geological structure, the mineral resources, and with the classification of the public lands of the United States. It was organized in 1849, and has developed since the creation of the Hayden, Wheeler, and Powell surveys of the Rocky Mountain region.

As the progress of the work conducted by it required the possession of accurate topographic maps, the preparation of such maps was commenced in 1882, and a large proportion of the topographic work of the Survey have been devoted to this work.

The work of the Survey, as at present organized, is as follows:

- The topographical or topographic maps.
- The preparation of geological maps.
- The collection of illustrations of the mineral resources.
- The study of the water resources of the arid regions.
- The examination of the forests of the west.
- The study and collection of the geobotanical and geological work.

The Geological Survey began, in 1882, the construction of a topographic map of the country. The work has now been in progress 15 years and a total of 800 square miles have been mapped. The areas shown on these maps are scattered widely over the country, and represent a great variety of topography, features and relief. Sheets can be used to illustrate a great variety of forms. These are used for a scale of one inch to one mile on the scale of 1:62,500, which is very nearly one mile to one inch. Another scale is 1:125,000, which is very nearly two miles to one inch, and a third scale is 1:250,000 or nearly four miles to one inch.

When for convenience the map is published in sheets of nearly uniform size, the portion of the sheet covered by the map

according to latitude from 12° to 30° north. For each of the scale 1:250,000 miles which is commonly called a "square degree" an area one degree in extent in each direction of longitude, latitude 10° to 41° in longitude 90° E. to 10° W. A sheet on the scale 1:125,000 which is of approximately the same size includes a tract of country 30 miles long by 30 miles wide, or one-fourth of a square degree, and a sheet on the largest scale, 1:62,500, includes an area 15 miles long by 15 miles wide, or one-sixteenth of a square degree.

Each of these maps shows features which are common

may be classed in three groups, viz. water features, including the sea, lakes, ponds, rivers and minor natural streams, rivers and irrigation canals; land features including mountains, hills, small valleys and culture features, i. e. the works of man, such as towns and cities, roads, railroads, boat docks, and bridges.

*Water features.* All water features are shown in blue. The smaller streams and ponds are filled in as such, and the larger ones are lakes and the sea by wavy blue lines. Contour lines are shown only a part of the year, being dry at some times, and other streams are shown only at low tides, but by dotted blue lines. Fresh-water marshes and swamps are shown by broken

o

lines and are shown simply by horizontal blue lines.

*Culture.*—The works of man are shown on the map in black, in which the dots and a printer's line bottoming. They are all represented and their names used to represent all and are explained in what is called the legend at the side of the map.

*Land features.* The land features are properly called the relief of the land, all the variations of the surface, the elevation of the land, the valleys, ridges and canyons, hills and mountains. These features are represented by curves of contour lines, or lines of equal elevation as on the level of the sea. The line of some mountain is a contour line—that is, a line of elevation. The contour

line is a line which is at a certain level as the line which would be a contour line, if the sea were to rise up the land to a certain level. The line would run back up the valleys and forward on the tops of the mountains.

On a gentlest slope of 1 foot in 100 feet, the contour line would be 100 feet from the present sea level. If the slope were a steep slope it would be very close to it. The contour lines of the sea are horizontal lines and above all of them, with equal vertical spaces between them, would be, if they were far apart on the map, a gentle slope; if they were close together, a steep slope, and if they were close to a single line as if they were on top of one another, they would make a mountain. The contour lines of any mountain, when represented on a map, show the elevation of any part of the map above the sea. They also show the shape of the ground and the forms of the mountains, hills and valleys; in short, of all the relief features. There is, however, one more printed in brown.

The geological work proper of the Survey consists in a study of the rock formations and in the mapping of their extent and form. The results are published in annual reports, in monographs, and in geological maps.

The Division of Hygiene, by its Geological Survey has in course and plan a study of the water resources of the United States, both above and below ground. Measurements are made of the amount of water discharged by various rivers in different parts of the United States, and from the facts thus obtained calculations are had of the daily flow, thus giving the discharge through portions of seasons and years. At the same time a careful study is carried on in sections and tiers of the geological strata with a special reference to the quality of the rocks as to give and transmit water, and, where practicable, maps are prepared showing the depth of the principal water-bearing strata as they are present in the various parts of the country, with a view as to the probability of obtaining supplies for various purposes. The opportunity of finding out the character of the rocks is readily brought into view, as several of the questions of development of water power, the supplying of cities or country homes with water, or the extension of agriculture are largely dependent on the water. In the west, where the former almost apply water art directly before a crop can be raised, the necessity that the supply must be ascertained before a great extension of it can be made is apparent. We know that the amount of water available from the surface is far less than the demand to be upon it, so that we must find it easy to find that the water depends upon the water supply. The United States being the great agricultural nation it is probable of the reclamation of this vast extent of arid country, and much as the part owner is concerned it seems that the largest use is made of the water.

The United States is engaged in making an examination of the forest reserves. It is must, with a view to securing the amount of timber on the land in the distribution of the same, the amount of the same within a large group of the same it is for a proper management of these reserves. It is expected further in the course of the study to be made to be made throughout the west.

The first report is about the same as a part of the work of the Division of the Survey of the past year, and will be accompanied by a collection of the same.

The Division of Statistics collects the statistics of production of minerals in the United States, and the same is an annual report.

The publications of the Survey consist of bulletins, lists of maps, geological maps, annual reports, bulletins, and other general. The atlas series are sold at a value of five cents, or



The Census Bureau is a temporary organization created for the purpose of taking the decennial census. The bureau obtains statistics regarding population, including age, sex, race, nativity and in the case of foreign born, the state of birth and the occupations of the people; it obtains statistics of different kinds of industry, of the value of the means of production and of the cost of other kinds of statistics; it obtains statistics of industries and of the number of the head of agricultural, manufacturing and trade farms, the acreage of the entire cultivated land, the magnitude of the principal crops, the amount of live stock, etc., and of the head of manufacturing establishments with their capital, material used, the cost and employees, and of the head of foreign trade, the statistics of the number of exports and imports and their character and products; to determine the value of transportation it obtains statistics concerning the quantity of freight and passenger tonnage and miles traveled by railroads, coastwise on lake and river, and by water. The results are published in a series of reports, volumes, and are summarized in a compendium and in an abstract. They are further summarized in more important form in a statistical abstract. A series of publications can be obtained on application to the secretary of the interior.

The Hydrographic Office of the Navy Department, and is in charge of a bureau of hydrography known as the Hydrographic Bureau. The function of this office is to prepare from the best available sources and to publish charts of foreign waters for the use of our navy and the merchant marine.

Besides this work the office is engaged in a study of the temperature, humidity, etc., distributed over the earth, as an aid to our navigation, and in the study of marine meteorology and of other currents.

The navy has charted areas along the coast of Mexico and elsewhere, and the results have been published by this office. It has also made valuable contributions to our knowledge of the general hydrography in the Gulf of Mexico and the Caribbean Sea, by its ocean soundings.

The charts published by this office are sold at prices differing with the size of the chart.



ה'תשנ"ב

The office is the first which is a modern building to be designed by the public body as a response to the duty to first of all act as to provide all the lands then parcels suitable for sale or otherwise of disposition. The front end of a new vision of the public estate has been, it is to say, a consistent one from the beginning. The land is divided by survey into townships six to nine acres and each of these into sections of one square mile. These sections may be further subdivided. This work is done

The map is on tract at certain rates per acre mile. It is survey maps required to provide a title map or parts of the same as an abstract and thus have been accumulated in the land office a vast mass of maps representing a period over a century or more. These maps are upon the uniform scale of two inches to a mile, but they are of varying degrees of exactness. From these maps the survey of the public land is calculated and presented in a series of twelve maps to an inch or, these maps form the basis of most of the atlas maps now being forth as the land office. The maps of the entire United States upon a scale of about forty miles to an inch. The state maps can be obtained and applied to the various other features of the land. The United States maps are sold at a price of \$1.80.

Thus, for this work of ethnography, we have resorted to a post-structuralist or deconstructive survey of the social and territorial boundaries.

[illegible]

The Great Survey was created by Congress in 1807, and within a few years had a number of ships out on the water. Since that time the Coast Survey has been in continuous operation. It is charged with the survey of the Atlantic, Gulf and Pacific coasts of the United States, including rivers to the head of the water or of navigation. It has carried on extensive deep-sea soundings, together with many other scientific observations, especially in

the report of the American survey by the same season. It is also the most complete observations for the determination of the correct magnetic dip, and force of the magnetic variation, and measures the force of gravity by means of the gravimeter. It is carrying out accurate triangulation in the interior of the country having already completed a belt across the continent from Lake Superior to the Gulf with a single run and of such accuracy as to admit of being surveyed. In addition to the triangulation the following series of accurate measurements have been made for the purpose of 1906.

The results of this work are published in the form of charts of the coast upon various scales, a portion of which the reader is represented by such charts, and others by profiles. These charts are sold at prices ranging from one cent to one dollar. The reader is referred to the reports, in which are contained the more complete and complete particulars pertaining to the work of the survey.

#### THE MISSISSIPPI RIVER COMMISSION

The War Department carries on a great variety of geographic work, mainly through the Corps of Engineers. By this the Commission has a complete survey of the shores of the Great Lakes and of the St. Lawrence. The charts resulting from this survey are of various scales, dependent upon the needs of navigators, and are sold at prices ranging with the size of the chart. The Mississippi and Missouri River Commissions are the two largest of the various boards of the Corps of Engineers. By the Mississippi River Commission that river has been

examined from point to point, and the various islands, shoals, and bars, the largest being 1,000 ft.

in a series of over 100 miles, while the waterway has been kept clear of the Mississippi from Cairo to the Gulf. As has been stated, the one large map of the river of four miles to an inch is a great sheet.

The Mississippi River Commission has mapped that river from the mouth to the Three Forks, a Montana point, and has mapped upon various scales, ranging from one mile to one inch, upward.

The Engineer Corps has also prepared the charts of the Colorado, the Arkansas, the Missouri, and the Yellowstone rivers. Copies of these maps can be obtained of sufficient to about 100 of the Engineers.

To this organization has been entrusted also the survey of the Colorado International boundary.

In 1897 1898 the two surveys of the geology of the west were completed. The U. S. Geological Survey has published a number of reports on the geology of the west, and the only ones that have been published are the only ones that have been published. They were published in a series of four numbers, each containing a number of pages. The first number was published in 1897, and the second in 1898. The third and fourth numbers were published in 1899. The first number was published in 1897, and the second in 1898. The third and fourth numbers were published in 1899.

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## THE GEOLOGIC ATLAS OF THE UNITED STATES

In the course of the study of the conditions of growth and development of the individual, we find that there are three normal stages in human development—the stages of growth are followed first by the stage of maturity, which is of comparatively short duration, and then by the stage of senescence. It is of course true that these stages were based on the study of individuals who died at comparatively early ages, and as such are somewhat hypothetical, but there are withal other indications of their approximate validity, particularly in the case of the aged. Some thinkers have gone so far as to say that if the world was ordered and ruled in accordance with the realization of the new factors, we should be able to extend the period of maturity. There is particularly one of the present population of America which is situated in a vast territory and possesses a large area of ~~land~~ <sup>land</sup>—a very necessary resource. By control of this new land, the individual history of the people can be made to be a great good result to the state, and the people can be made to be a great good to the state, and the state can be made to be a great good to the people.

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## THE TOPOGRAPHIC ATLAS OF THE UNITED STATES

"In 1882 the United States Geological Survey began the construction of a topographic map of the country. The work has now been in progress fourteen years, and about 600,000 square miles have been mapped. The areas shown on these maps are scattered widely over the country and represent a great variety of topographic features, and the map sheets, with the aid of descriptive text, can be used to illustrate topographic forms. This led the Director to propose the publication of an educational series of folios, for use wherever geography is taught in high schools, academies, and colleges. Authority for their publication and sale was granted by Congress in an act approved March 2, 1895. . . . The first folio of the series presents on ten maps illustrations of some of the simplest and most characteristic types of topography to be found in those parts of the United States which have thus far been mapped. Subsequent folios will illustrate more complex forms."

So Henry Gannett, Geographer of the United States Geological Survey, introduces an illustrated treatise in folio form on the "Land Forms of the United States."\*

When geographic exploration brought to the knowledge of men the unparalleled Grand Canyon of the Colorado and the picturesque plateau country adjacent, the way was prepared for the discovery of new principles in geographic development; in good time Powell descended the Canyon, and he and his collaborators surveyed the plateau country, and as the work progressed the "basel level of erosion" was recognized. The idea quickly took root, and grew into one of the fundamental principles of earth-science; spreading eastward into provinces already reconnoitered or surveyed, it was found to afford a new means for interpreting earth-history, and thereafter the later stages in the geographic development of the continent were read from land forms as well as from fossil plants and animals. The principle

\* Department of the Interior (United States Geological Survey) (Charles D. Walcott, Director) — (Topographic Atlas) of the (United States) (Physiographic Types) by (Henry Gannett) — (List of contents, etc.) (Part I. Physiography) (Washington, D. C.) (Congress and printed by the U. S. Geological Survey) (S. J. Kelso, Chief Engraver) 1898.

was applied to southeastern United States, where the important episodes in continental history are clearly recorded in the plateaus and canyons of the Piedmont region, and where the minor movements are recorded in unconformities separating the deposits of the Coastal plain; it was applied most successfully in New England and elsewhere by Professor Davis, who reads earth-history from topographic maps. Within a dozen years the principle has been widely recognized among investigators, and has given birth to a science—Geomorphology or the New Geology. Thus far this line of learning has mainly been confined to a limited number of original investigators and teachers in high grade educational institutions, and has lain beyond the reach of the general school and the citizen; but now Mr Gannett's treatise, issued by a public office, brings this distinctively American advance in science within reach of the American public.

The atlas comprises ten maps, of which the first three are devoted to the now well-known stages in topographic development—youth, maturity, and old age. The fourth illustrates a rejuvenated region, typifying the Piedmont plateau. The fifth map represents a young volcanic mountain, its subject being one magnificent volcanic cone, Mount Shasta. Moraines and drumlins, representing characteristic phases of ice-work, are shown on the sixth and seventh sheets, and a fiord coast, with its picturesque record of ice-work half drowned in ocean, forms the subject of the ninth sheet. The two remaining sheets illustrate river flood-plains and a barrier beach coast. The text includes an exposition of the conventions used in topographic mapping, and a full description of each of the sheets with a fuller interpretation of its features as records of geographic development.

The issue of this folio marks an epoch in geographic teaching. Hitherto teachers have been hampered in their work by glittering generalities in the books, or by the veils of little-understood realities in their sight; but now comes a series of American illustrations, shown in such detail that any teacher may correlate the features with those of his own landscape, and these are interpreted by the hand of a master so clearly that even the average pupil cannot fail to read aright.

The atlas folio may be obtained at the nominal price of 25 cents on application to the Director of the Geological Survey.

W. J. M.



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